

CHAPTER IX

VE EXAMPLES

Introduction

This chapter contains examples of successful application of VE demonstrating the broad range of products and circumstances for applying VE effort.

I. TF 39 Engine Exhaust Nozzle Replacement

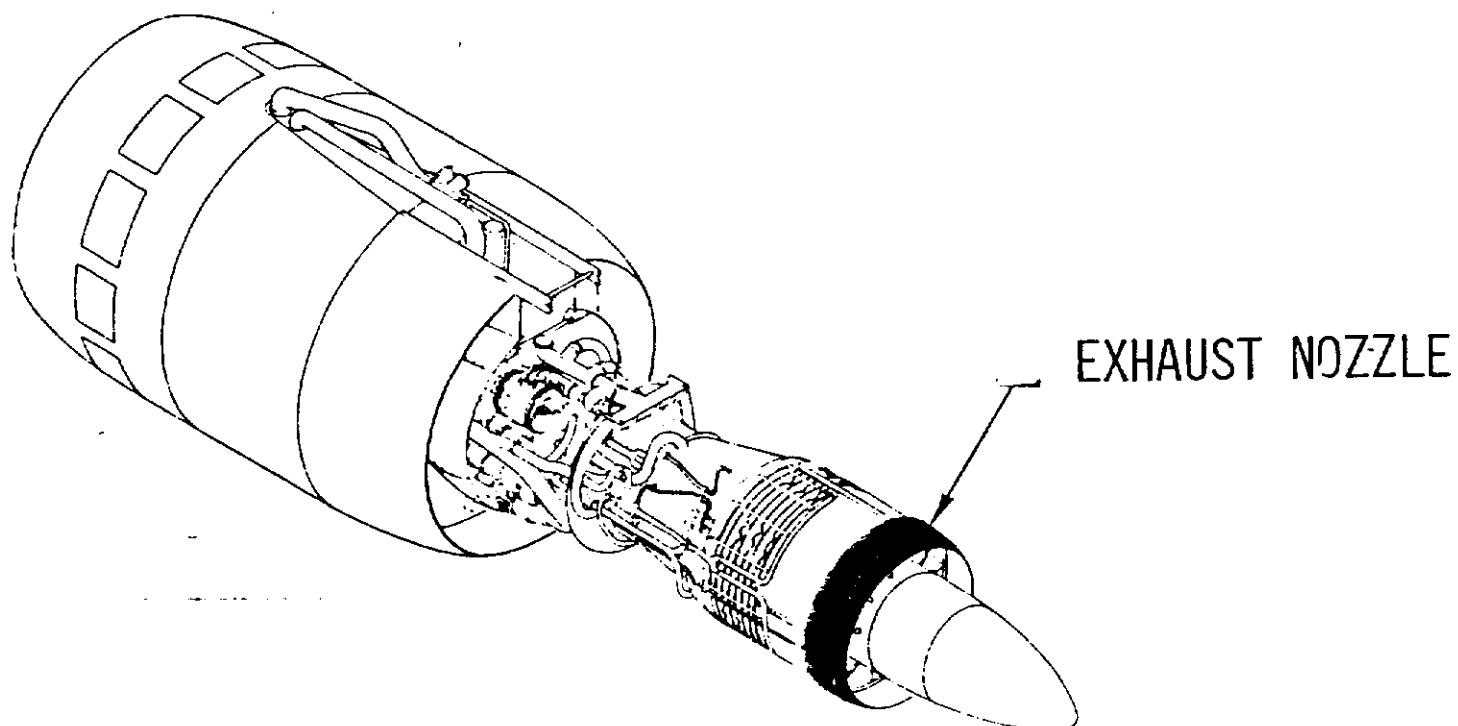
SAN ANTONIO ALC VALUE ENGINEERING (VE) PROJECT

SUBJECT : TF 39 ENGINE EXHAUST NOZZLE REPLACEMENT

BEFORE : \$1,141,885.00/YRWAS COST TO OVERHAUL AND REPLACE ENGINE EXHAUST NOZZLES WHICH SEEMED EXCESSIVE . A VE TEAM ANALYZED THE PROBLEM AND INITIATED TESTING ON NOZZLES PREVIOUSLY REMOVED FOR OUT-OF-TOLERANCE DENTS AND BULGES.

AFTER : STUDY AND ENGINE TESTING SHOWED ONLY 15% OF ENGINE THRUST GOES THROUGH THIS NOZZLE AND DAMAGE TOLERANCES COULD BE OPENED FROM .020'" TO .50" WITH NO SIGNIFICANT EFFECT. THIS REDUCED FIELD REMOVAL BY 50% AND ALLOWED FIELD REPAIR OF MOST OF THE UNITS; THEREFORE , MOST OF THE EXPENSIVE DEPOT REPAIR WITH ASSOCIATED SHIPPING COSTS WAS ELIMINATED . PREVIOUSLY CONDEMNED NOZZLES COULD BE REWORKED AND RETURNED TO SERVICE.

SAVINGS: \$1,038,568.00 FIRST YEAR.



II. C-5B Aircraft Landing Gear Brakes

An example of a VE study done on the C-5B aircraft landing gear brakes for the U.S. Air Force is shown below. The VE study centered on the substitution of material, which realized a net savings to the Government of \$7,800,000.

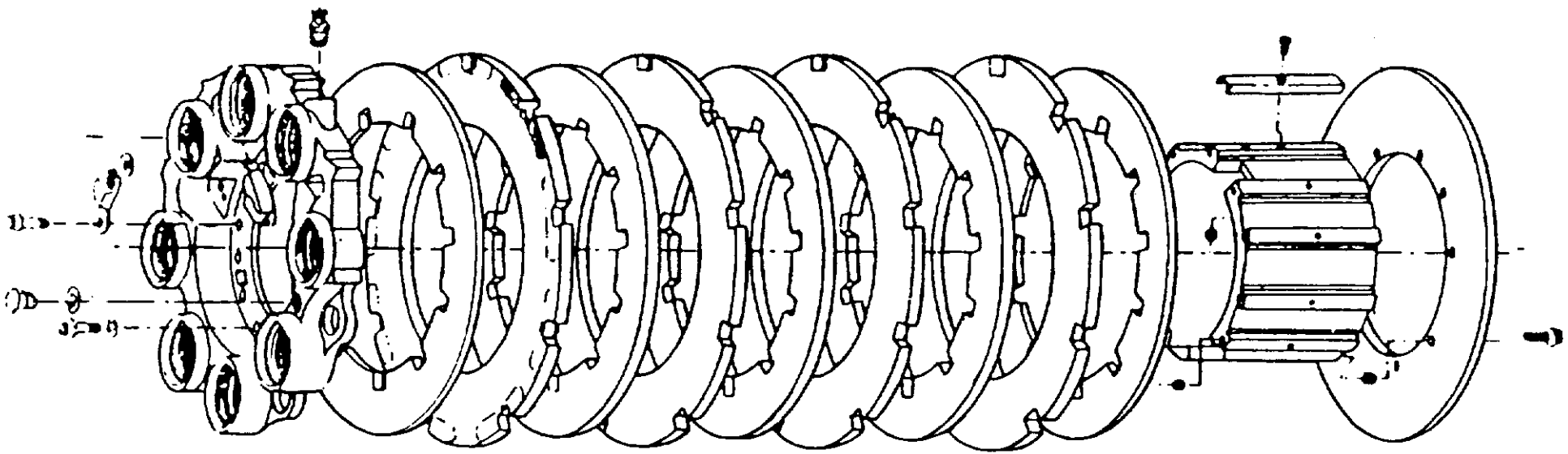
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MLG WHEEL BRAKES

BEFORE:

C-5B AIRCRAFT LANDING BRAKES CONSTRUCTED OF BERYLLIUM MATERIAL

1. MATERIAL SERIOUS HEALTH HAZARD DURING REFURBISHMENT
2. HIGH COST MATERIAL
3. SPECIAL CLOTHING REQUIRED DURING HANDLING/REFURBISHMENT
4. 750 LANDINGS



AFTER:

C-5B AIRCRAFT LANDING GEAR BRAKES CONSTRUCTED OF SPECIALLY TREATED HARDENED CARBON MATERIAL

1. NO HEALTH HAZARD DURING REFURBISHMENT
2. LOWER MATERIAL COST
3. NO SPECIAL CLOTHING REQUIRED
4. SIGNIFICANTLY MORE LANDINGS

NET OVERALL SAVINGS TO THE GOVERNMENT -\$7,800,000

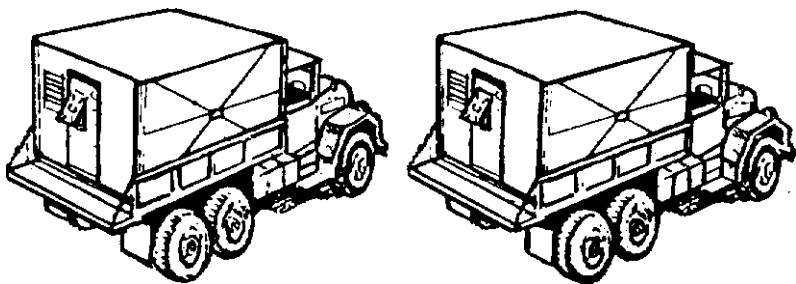
III. AN/TYC-39 Automatic Message Switch

- The U.S. Army Communications and Electronics Command received and approved
- a VECP from the contractor to reduce life-cycle costs of the message switch for those applications not requiring a 50-line capability. This was achieved by replacing the existing dual shelter message switch with a single message switch, as shown below. While providing adequate communications capability, the single shelter message switch resulted in savings in equipment acquisition costs, training, maintenance, and operational needs.



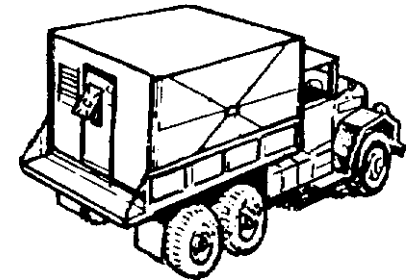
VALUE ENGINEERING PROGRAM USACECOM AN/TYC-39 MESSAGE SWITCH

BEFORE



- **50 LINE** DOUBLE SHELTER MESSAGE SWITCH
- **TWO 5 TON** TRUCKS
- **60 KW** GENERATOR
- **TWO TRUCK OPERATORS**

AFTER



- **25 LINE** SINGLE SHELTER MESSAGE SWITCH
- **ONE 5 TON** TRUCK
- **30 KW** GENERATOR
- **ONE TRUCK OPERATOR**
- **REDUCED MAINTENANCE**
- **FEWER SPARES**
- **REDUCED FUEL CONSUMPTION**

COMMUNICATIONS SYSTEMS DIVISION
GTE PRODUCTS CORPORATION
NEEDHAM HEIGHTS, MA

VECP TOTAL CONTRACT SAVINGS: \$1,994,000
ROI - 12:1

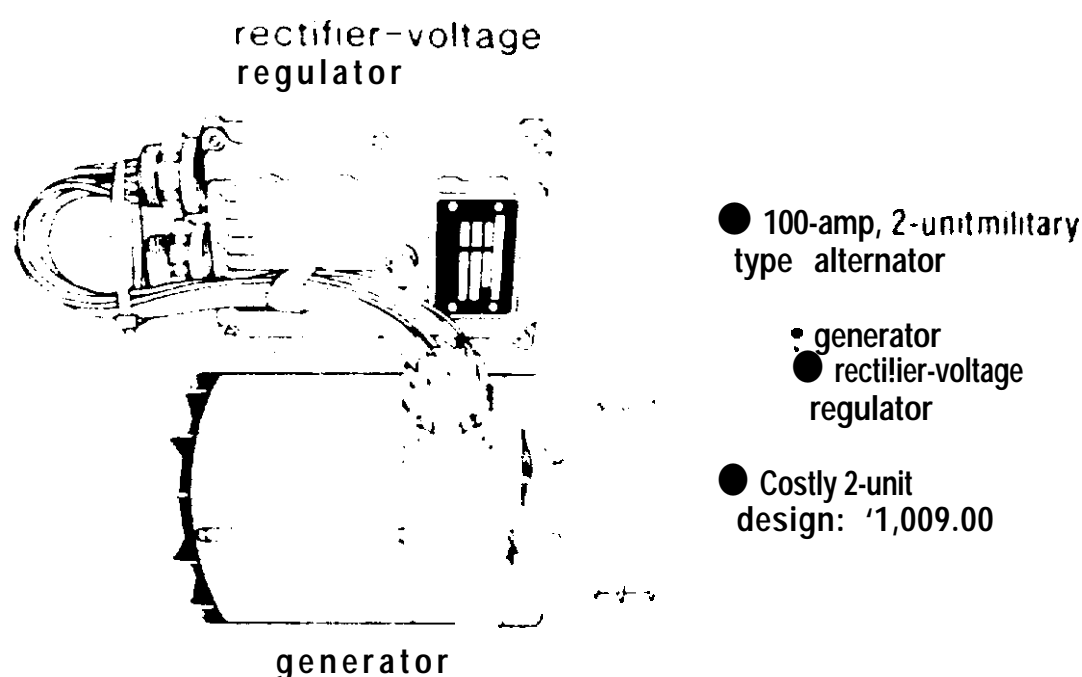
IV. Use of Commercial Alternator In Lieu of Military Alternator

The U.S. Army Tank-Automotive Command conducted an in-house VE study which researched the possibility of using two commercial 100 AMP alternators in lieu of 180 AMP military-type alternators without sacrificing quality performance. The military type alternator design features an assembly of two units, a generator and rectifier-voltage regulator. The commercial diode-rectified generator (often called alternator) features a simple one-unit design and is less costly to produce. By replacing the military-type alternator with the commercial unit, improved performance and cost reduction was attained. The first year's net savings was \$11,896,163. The implementation cost was \$10,000, or a return on investment of 1190 to 1.

US ARMY TANK-AUTOMOTIVE COMMAND

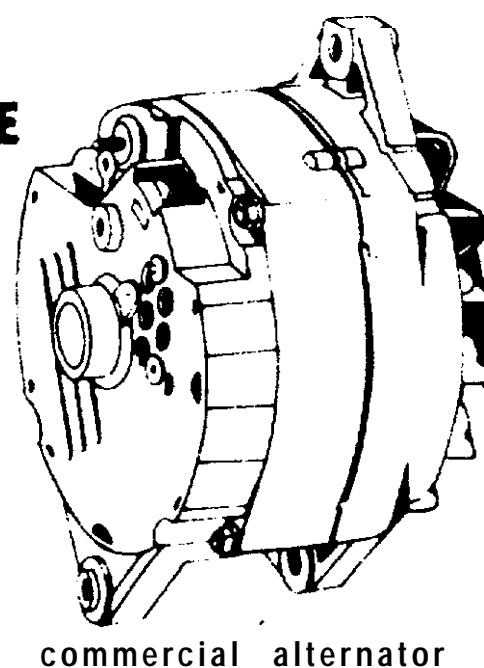
USING SIMPLER COMPONENTS

BEFORE VE



AFTER VE

- Replaced by 100-amp commercial alternator
- Less costly 1-unit design: \$300.00

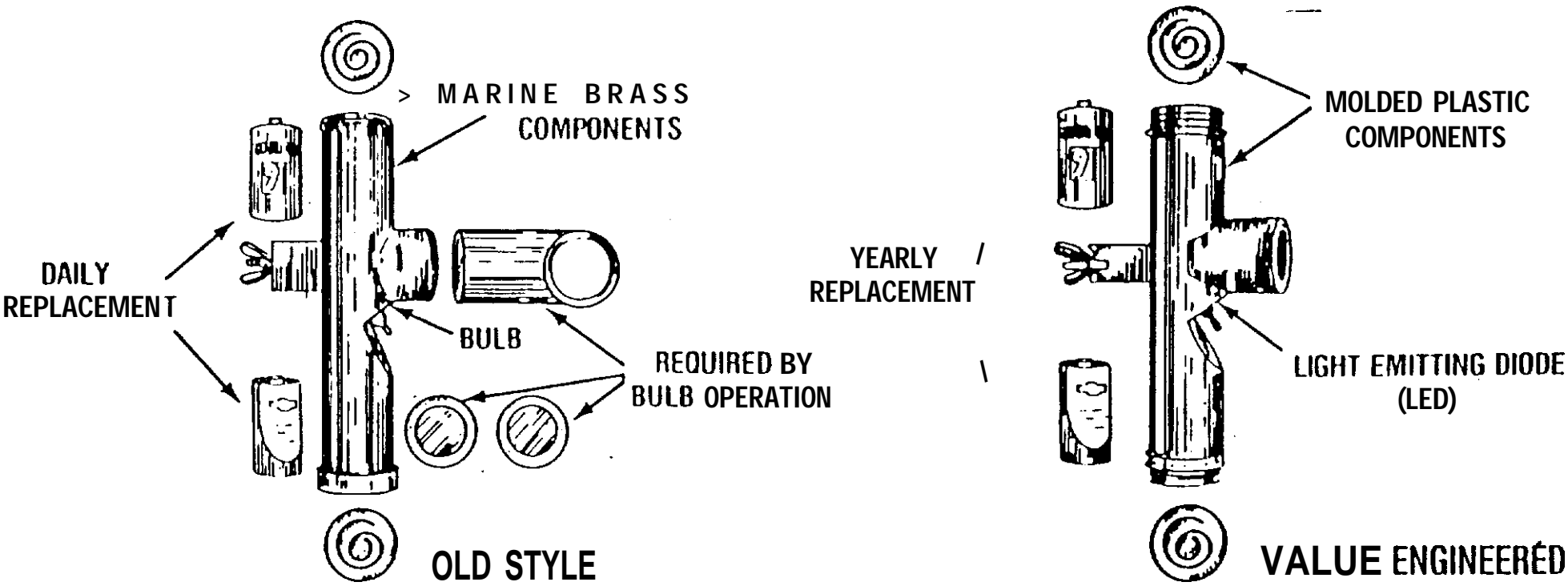


FIRST YEAR SAVINGS: \$11.9 Million

V. M14 Aiming Post Light

The US Army Armament Materiel Readiness Command received and approved a VECP on its M14 Aiming Post Light. For the previous design a labor-intensive method of fabrication was seriously limiting the production rate. In addition, the old design resulted in operational and maintenance problems. The heavy draw of the incandescent bulb required daily battery replacement and its nonwaterproof design led to frequent failure due to galvanic corrosion. As shown below, the new design permitted higher production rates, extended the battery life to 1,000 hours, and was waterproof. The annual savings achieved through this VECP was \$222,497.

IMMCOVECP's4028-16/17-M14 AIMING POST LIGHT



CHARACTERISTIC	OLD STYLE	VALUE ENGINEERED	IMPROVEMENT
COST	\$18.52	\$9.25	50%
BATTERY LIFE	8-12 HRS	1000 HRS	9,900%
WEIGHT	19 Oz	7 Oz	63%
MIN OPERATING TEMP	ABOUT 0°F	" BELOW -30°F	SIGNIFICANT
WATERPROOF	NO	YES	SIGNIFICANT
MATERIALS	WARTIME CRITICAL	COMMON	SIGNIFICANT
LIGHT COLOR CHANGE	CHANGE LENSES	FLIP SWITCH	SIGNIFICANT
SHAPE	REQUIRED	NOT REQUIRED	SIGNIFICANT
PRODUCTION RATE	LIMITED	VERY HIGH	SIGNIFICANT

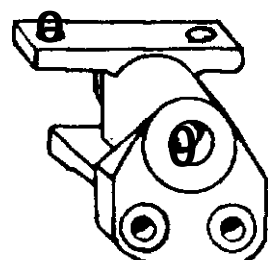
AVG ANNUAL GOVT SAVINGS - \$222.500 RETURN ON INVESTMENT -23'1

VI. M60 Tank Seat Brackets

During the conversion of the M60 Tank from the A1 model to the A3 model tank, it was determined that the seat support brackets for the A1 model series would not work in the A3 model series. New brackets would have to be . . . procured at a cost of \$196.53 each. Anniston Army Depot performed a Value Engineering study on the brackets and determined that the A1 model series brackets could be modified for use in the A3 model series at a cost of \$12.80 each. This eliminated the new procurement requirement and resulted in a first-year savings of \$120,000.

US ARMY DEPOT SYSTEM COMMAND Anniston Army Depot MODIFYING SEAT BRACKETS

BEFORE VE



New A3 bracket

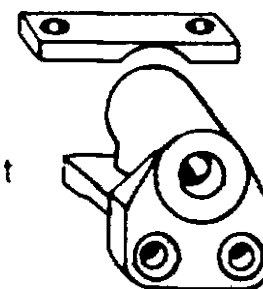
- New seat support brackets required for M60 tank conversion from A1 to A3
- New procurement required
- New brackets: \$196.53 each



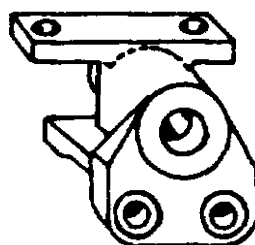
AFTER VE

- Original A1 modified to A3 configuration
- New procurement eliminated
- Modified brackets 12.80 each

Original A1 bracket



Modified A1 bracket



FIRST YEAR SAVINGS: \$120,000

VII. MK 82 Bomb Skins

The bomb skin (shell) of the MK 82 Bomb is used during peacetime training. When available supplies were exhausted, a new procurement of the bomb skins was planned. The bomb skins were available from the production contractor at a cost of \$430 each. The U.S. Army Armament Materiel Readiness Command conducted a Value Engineering study on the bomb skin and the training requirement. The study determined that old MK 82 bomb skins from items being demilitarized could be refurbished and used for training at a cost of \$70.93 each. This resulted in a first-year savings of \$3.5 million and a return on investment of 6 to 1.

US ARMY ARMAMENT MATERIEL READINESS COMMAND

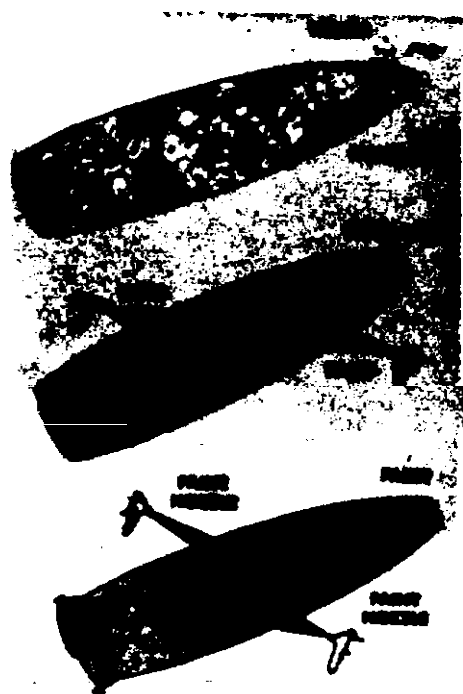
REFURBISHING MK 82 BOMB SKINS BEFORE VE ,

- Elongtr skins needed for additional training requirements
- New procurement needed
- New training bomb skins '430 each



NEW BOMB SKIN
FROM PRODUCTION CONTRACTOR

AFTER VE



- in-house refurbishment of available demilitarized bomb skins
- Cost savings per bomb skin \$359.07

FIRST YEAR SAVINGS: \$3.5 Million
RETURN ON INVESTMENT: 6 to 1

In the directorate for maintenance at the New Cumberland Army Depot, there were no rework procedures for certain aircraft components that have nicks, pitting, corrosion, or scratches. These items were scrapped and sold for mixed metal at approximately \$0.02 per pound. An in-house VE study was conducted, and the Selection Process was proposed and approved. This process is a completely mobile selective metal depositing deposition system for resizing, restoring and repairing worn or damaged metal parts without the need for costly disassembly, complicated masking, and long periods of down time. The build-up areas will be equal to or have a better metallurgical quality than the existing base metal. There was an annual gross savings of over \$5,000,000, with an implementation cost of approximately \$34,000 at the New Cumberland Army Depot. This proposal was recommended to be adopted ArmyWide. If it is implemented ArmyWide the Government should realize an annual savings in excess of \$100,000,000.

US ARMY DEPOT SYSTEM COMMAND

New Cumberland Army Depot RECLAIMING CH47 VERTICAL SHAFTS

BEFORE VE



- Pitted and corroded shafts classified unserviceable
- Replacement cost: \$70,000 per shaft



AFTER VE



- VE study developed special procedure to repair pits and corrosion
- Reclamation cost: \$5,660 per shaft

FIRST YEAR SAVINGS: \$7.5 Million
RETURN ON INVESTMENT: 11 to 1

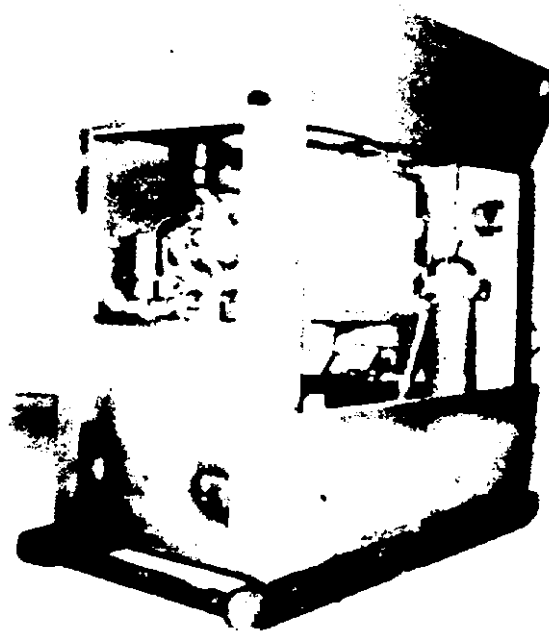
1x. Compressor

The U.S. Army Mobility Equipment Research and Development Center designed and developed an air compressor for filling air tanks for Army scuba divers. The MIL-SPEC compressor was designed to user requirements. The estimated procurement cost of this compressor was \$40,000 each. A Value Engineering study was performed on the design specifications, and the user requirements. The changes to the specifications and user requirements resulting from the study established the "actual" performance requirements. Although commercial compressors could not meet the original specifications and requirements, the "actual" performance requirements could be met by some commercial compressors. Commercial compressors were procured at a cost of \$16,000 each. A first-year savings of \$879,000 and return on investment of 88 to 1.

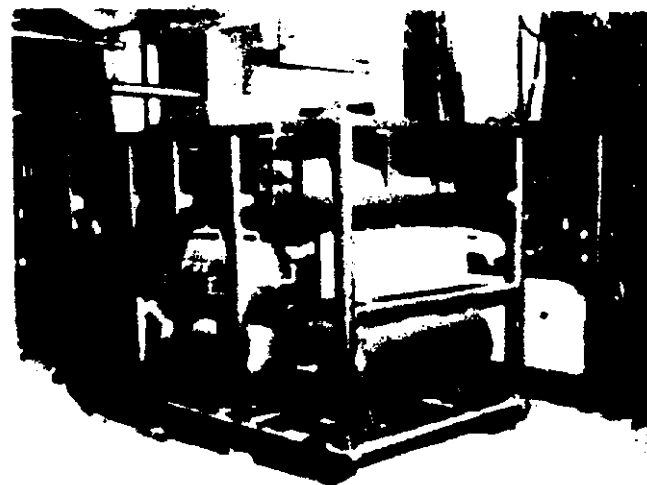
US ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT COMMAND

SUBSTITUTION FOR MIL-SPEC COMPRESSOR BEFORE VE

- Rigid air flow rate and pressure specifications
- Suitable commercial compressors not available
- MIL-SPEC compressor
Cost: \$40,000 each



AFTER VE



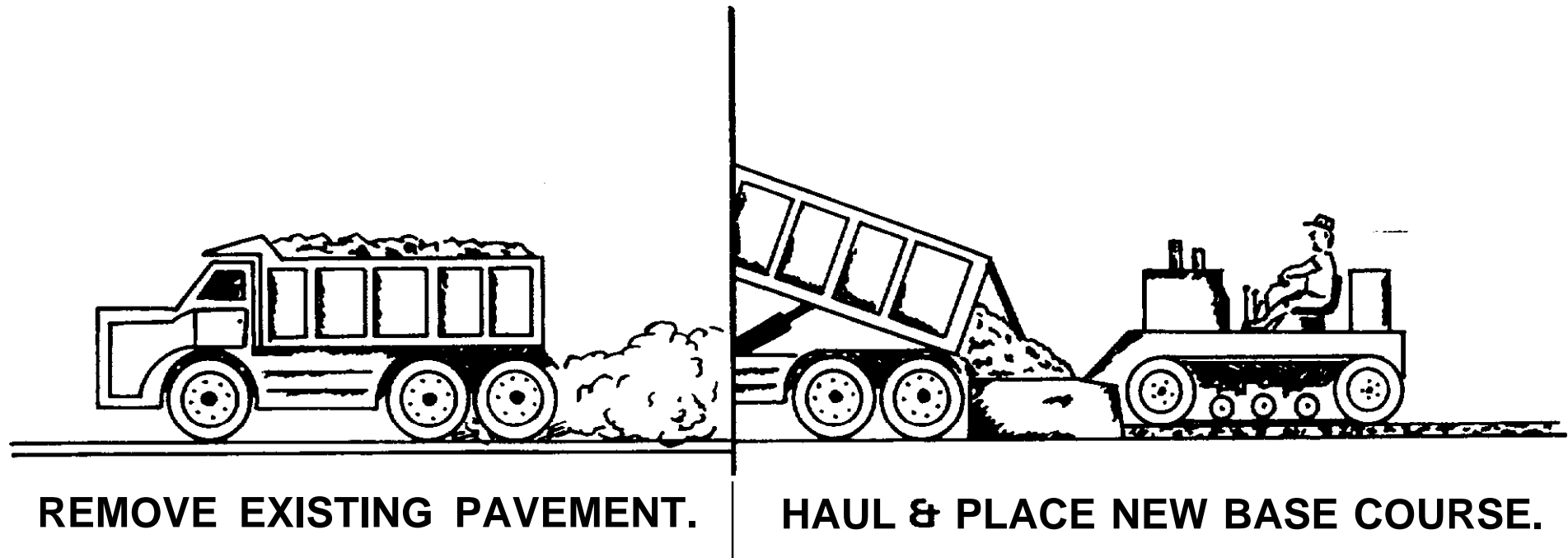
- Military specifications challenged and changed
- Some commercial compressors now suitable and safe under new specifications
- Commercial compressor
Cost: \$16,000 each

FIRST YEAR SAVINGS: \$879,000
RETURN ON INVESTMENT: 88 to 1

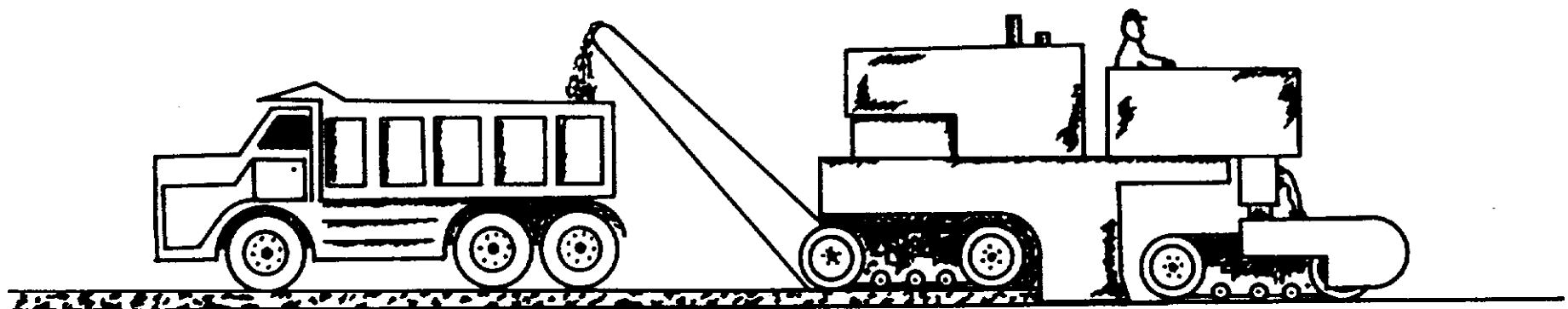
X . Airfield Taxiway & Apron

Project as designed called for complete removal and replacement of all existing taxiway and apron materials. The contractor's proposal recommended removing the existing asphalt pavement with a rota mill machine which grinds the material into pebble size granules. Then the recycled material is reused as base course material in lieu of purchasing and hauling in new base material.

AIRFIELD TAXIWAY & APRON



AS DESIGNED



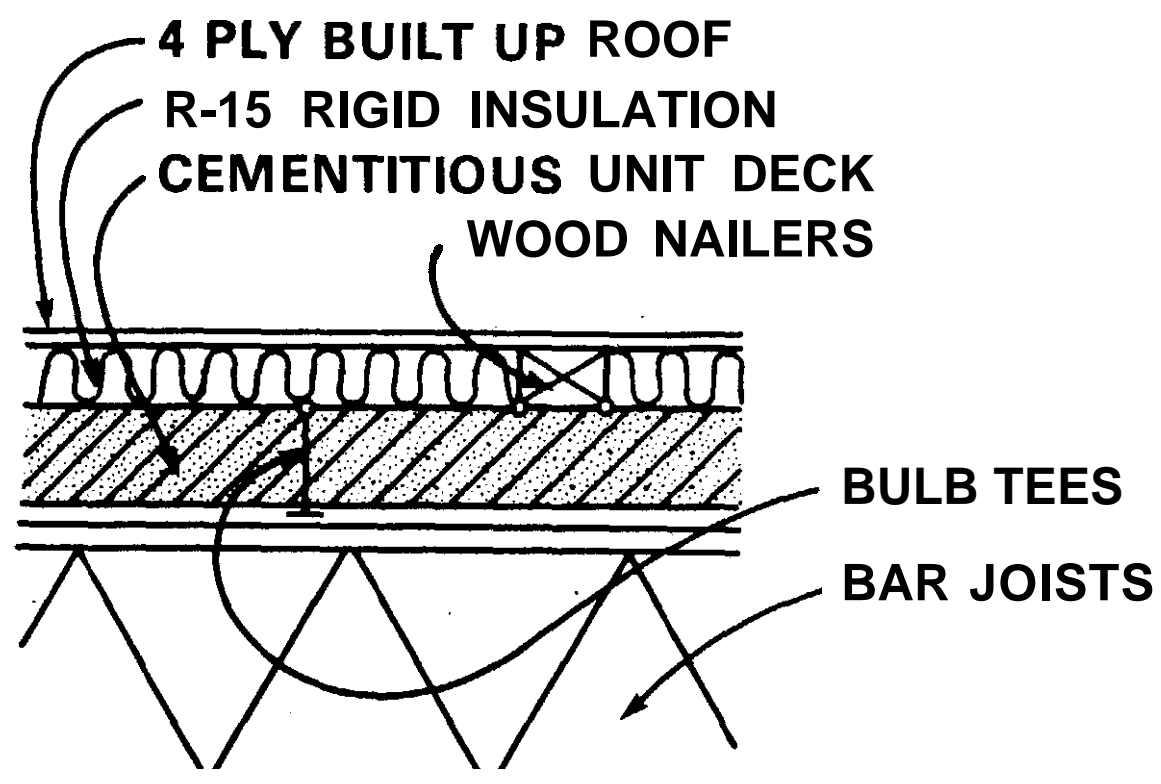
ALTERNATE

SAVINGS – \$88,684

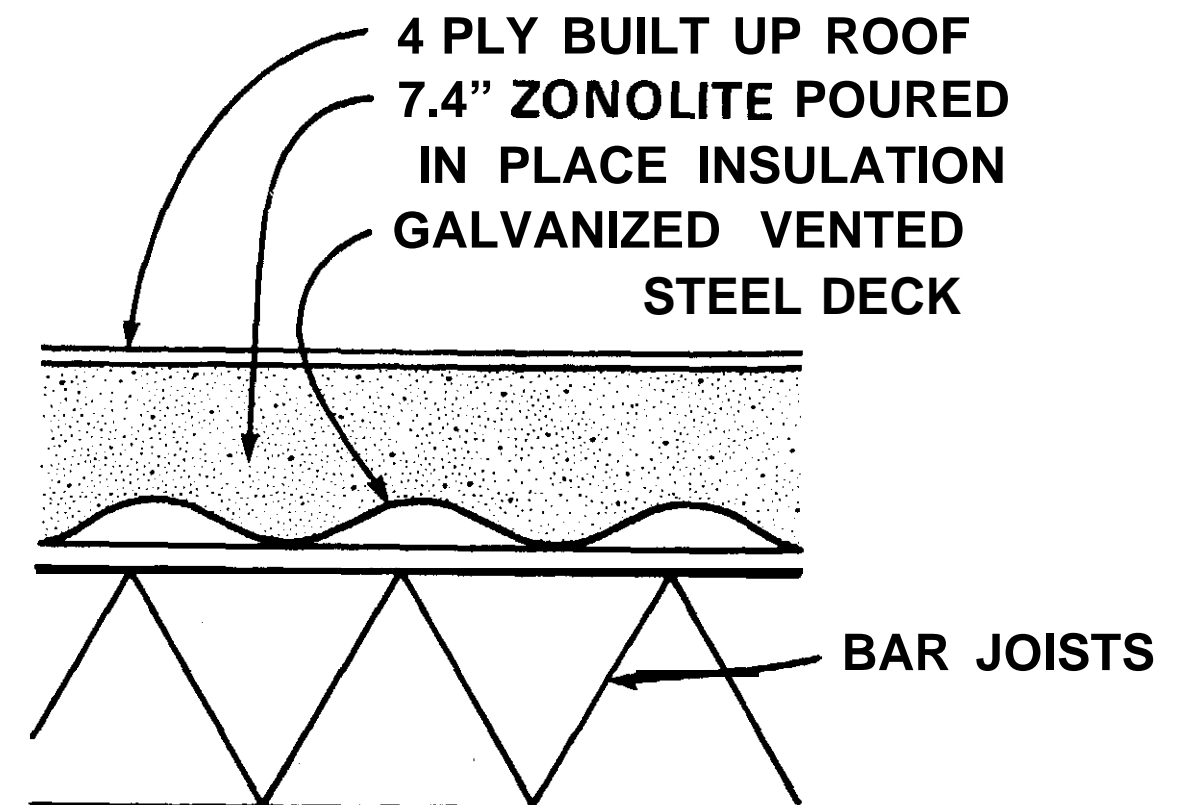
XI. Roof

The original design called for a specialized roof construction of bulb tees, cementations deck, rigid insulation and wood nailers. The contractor's proposal recommended a more conventional and less costly roof construction sequence of steel decking and poured in place zonolite insulation fill. The proposal was evaluated and accepted,

8-11



AS DESIGNED



ALTERNATIVE

SAVINGS - \$43,000

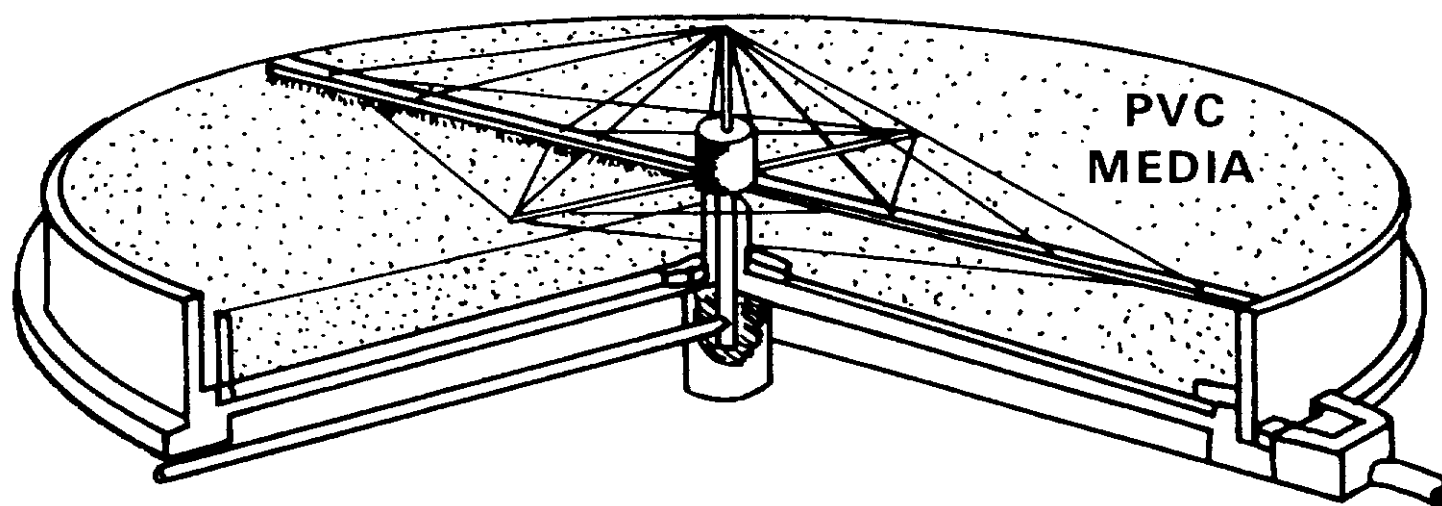
XII. Sewage Collection & Treatment

The project required reworking the existing trickling filter by ramming the existing stone bed (media) and replacing it with a very high cost PVC media. The contractor upon investigation of the existing trickling filter and stone base, recommended removing, cleaning and reinstalling the existing stone media in lieu of installing the very high cost PVC substitute media. The proposal was evaluated and approved.

SEWAGE COLLECTION & TREATMENT

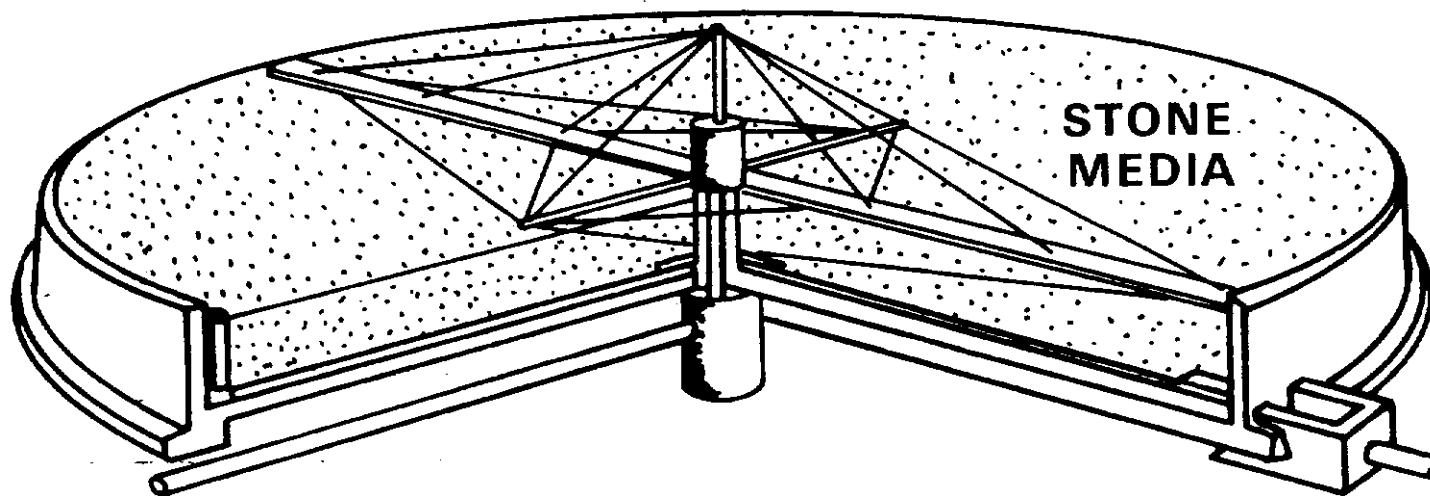
BEFORE:

REMOVE STONE MEDIA & INSTALL PVC MEDIA.



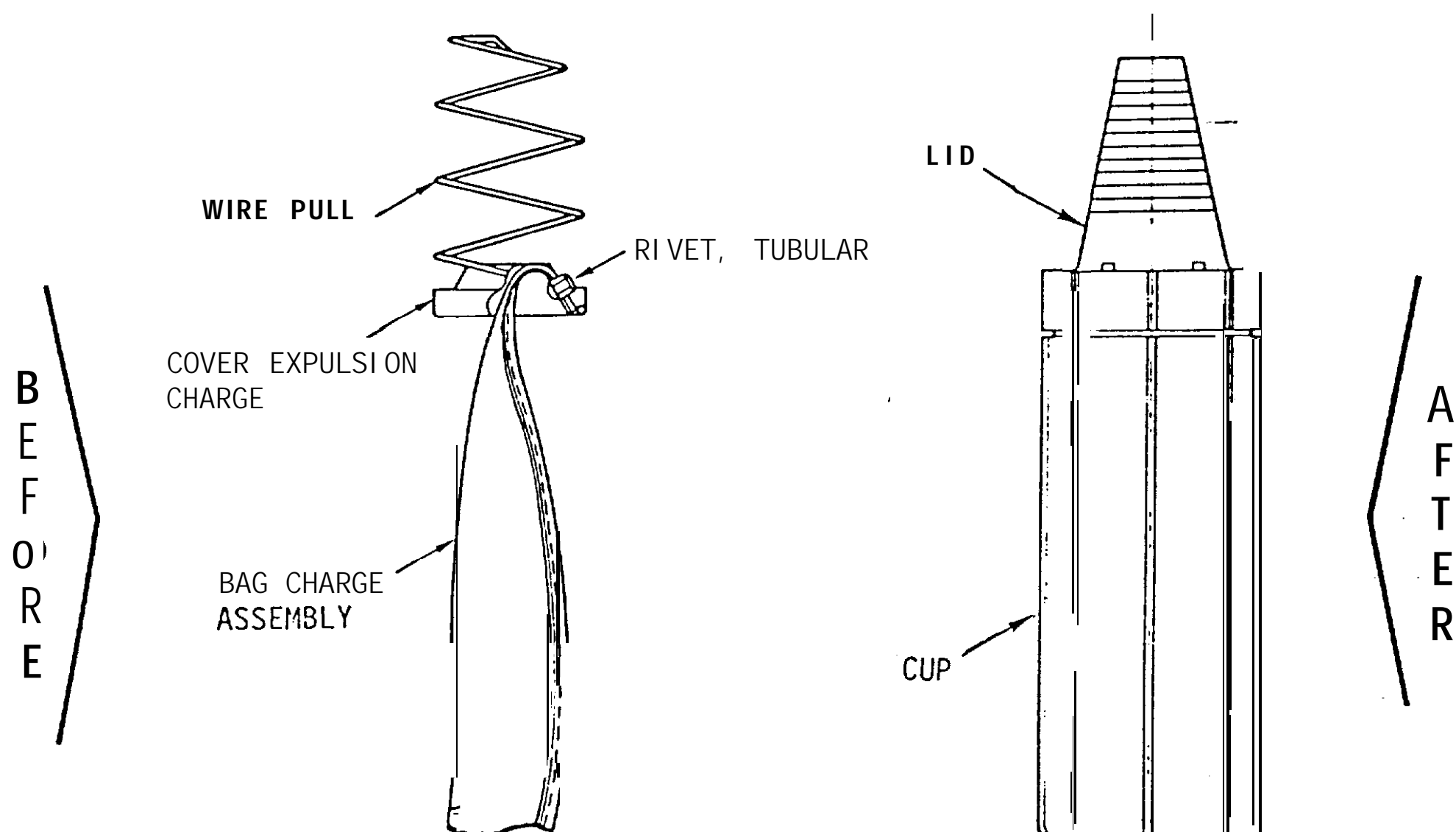
AFTER:

REUSE EXISTING STONE MEDIA.



SAVINGS – \$338,600

DAY & ZIMMERMAN, INC. VECP KS-4012-154
PLASTIC EXPULSION CHARGE ASSEMBLY
FOR M483A1-155MM PROJECTILE



BAG
ASSEMBLY \$4.52

PLASTIC CUP
ASSEMBLY \$1.13

UNIT SAVINGS \$3.39

3 YEAR SAVINGS FOR THE US ARMY
\$4,680,000

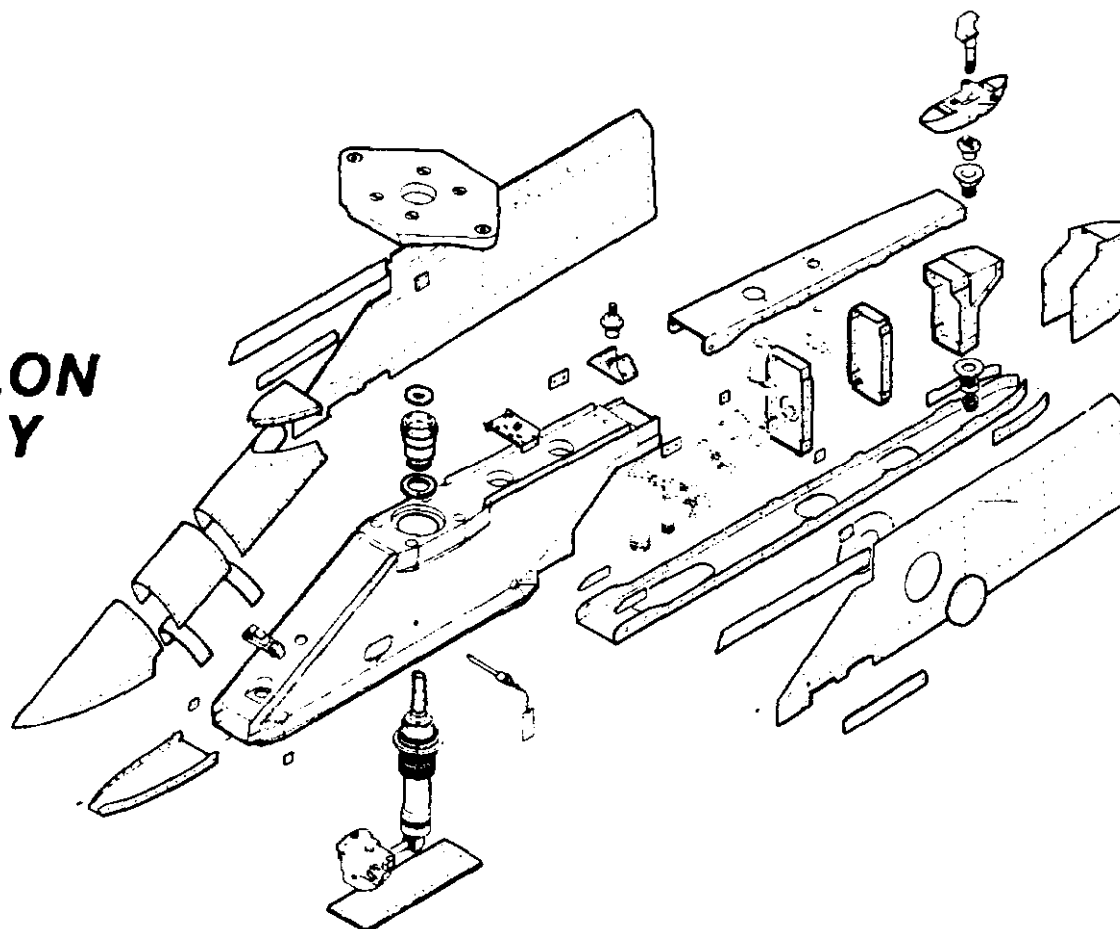
VECP 0668

REDESIGN OF FUEL PYLONS

PRIOR TO VECP:

**FUEL PYLON
ASSEMBLY**

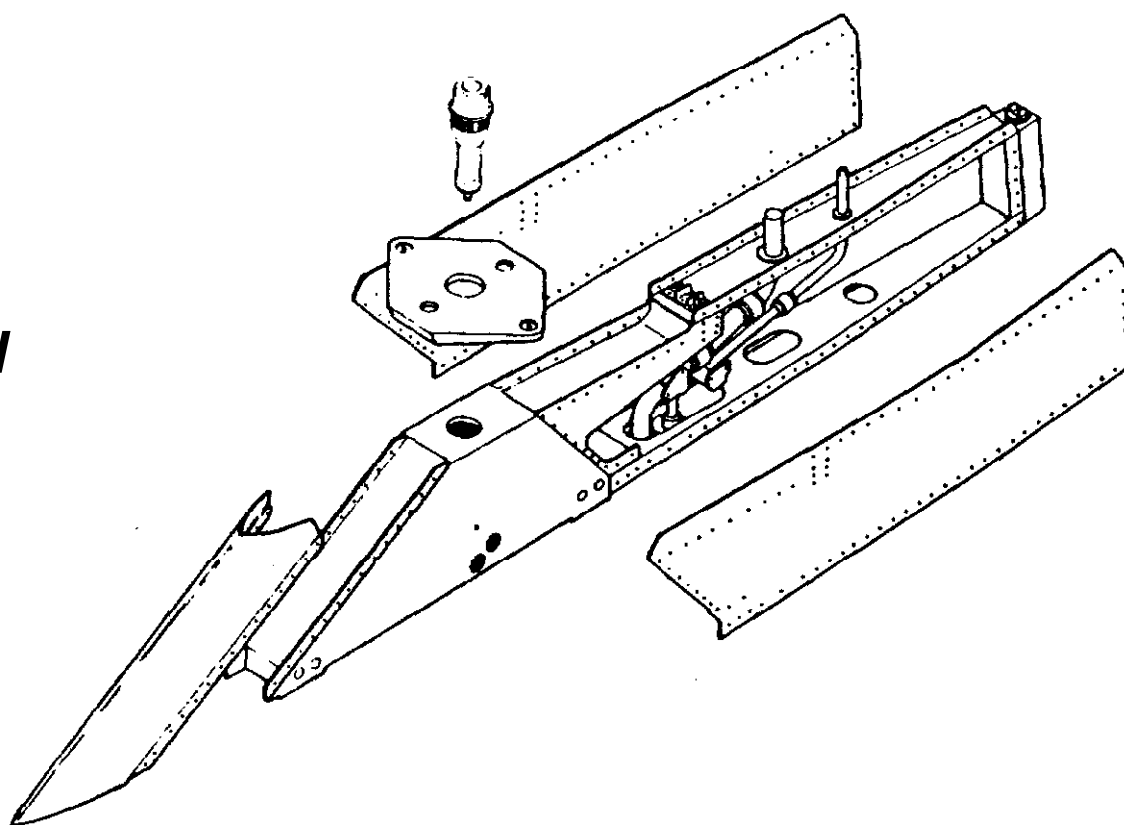
**PARTS REQUIRED FOR
ASSEMBLY = 62**



AFTER VECP:

**FUEL PYLON
ASSEMBLY**

**PARTS REQUIRED FOR
ASSEMBLY = 24**



TOTAL PARTS REDUCED = 38

TOTAL SAVINGS= \$20.8 MILLION



**HARDWARE
VECP**

GENERAL DYNAMICS
Fort Worth Division

VECP 0875

COMPUTER GENERATED TECHNICAL MANUALS

. PRIOR TO VECP:



MANUALLY GENERATED

5 TRANSACTIONS BEFORE DELIVERY TO CUSTOMER

AFTER VECP:



***COMPUTER GENERATED (REQUIRED REVISION TO
MILITARY SPECIFICATIONS)***

1 TRANSACTION BEFORE DELIVERY TO CUSTOMER

TASKS ELIMINATED:

REPRINTING (LOGISTICS)

REVIEW (ENGINEERING)

TOTAL SAVINGS: \$990,000



**SOFTWARE
VECP**

GENERAL DYNAMICS
Fort Worth Division

XVI . Men's Dress Shoes

A VE study conducted at Army's Natick Research and Development Laboratories focused on substitution of new materials for the leather in men's dress shoes. The substitution of synthetic rubber soles for the traditional leather soles resulted in a savings of \$3 per pair of shoes. This savings translated into a \$2,811,996 reduction in the cost of procuring the first year's requirement of these shoes for the Military Services.

XVII. Automated Pay Data Requirements

At the Sacramento Air Logistics Center (SM-ALC), a review was made of the efforts utilized in collecting civilian pay related information by Resource Cost/Center Code. This procedure is needed to calculate the Civilian Fringe Benefit Factor, as required by OMB Circular A-76. Approximately 800 man-hours were required to collect and calculate the required information. An additional 30 hours was required to type the results in a prescribed format. A value analysis of the above methods and procedures resulted in a program designed for a particular minicomputer. This program eliminates manual data collecting and calculations, while printing the output in the prescribed format. Although this project only saved \$10,118 per year at SM-ALC, it was recommended for Air Forcewide consideration.

XVIII. Drone Formation Control System (DFCS) To Control Multiple Ground Targets

In order for the White Sands Missile Range (WSMR) to support the Assault Breaker Project, a system was required which could present as many as ten ground targets (tanks) in a remotely controlled configuration. The criteria the targets had to meet were that they should be separated by 50 to 100 meters, that their position be controlled with an accuracy of +10 meters or better, and that they travel a roadway as narrow as 15 meters. Since WSMR's capability to control ground targets was limited to manual remote-control of two vehicles, it appeared a new tracking and control system would be required. This would have meant a developmental effort and a rather lengthy, costly contract.

A WSMR employee proposed modifying an existing system (i.e., Drone Formation Control System (DFCS)), which was originally designed to control aerial targets, in lieu of acquiring a new control system. The modified system provides the capability to track and control as many as 15 tank targets within the constraints described above. Twelve tanks are instrumented to provide two back-up (spare) units. The cost of acquiring a new system was conservatively estimated to be \$2,811,000. The cost of modifying the DFCS was \$285,000. This resulted in savings of \$2,526,000.